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RESEARCH PRIORITIES FOR PENAEID SHRIMP MARICULTURE[1]

Albert K. Sparks, Laboratory Director
National Marine Fisheries Service Biological Laboratory
Galveston, Texas 77550

Three major areas of investigation must be given priority if shrimp mariculture is to become economically feasible. These are studies of mortality and its causes in hatcheries and ponds, nutritional studies, and sexual maturation of female shrimp.

We know that varying percentages of fertile eggs spawned by every gravid female will fail to attain the postlarval stage suitable for pond stocking. Some larval and postlarval mortality can be attributed to known causes such as overcrowding and concomitant deterioration of water quality, insufficient or inadequate food, and failure to maintain proper temperature conditions. Other causes of hatchery mortalities that drain off 10 to 50% of every spawning are inexplicable, and catastrophic epizootics are a constant threat.

The history of shrimp survival in ponds is discouraging, with poor survival the rule rather than the exception. The relatively high cost of larvae coupled with the expense of land and construction require good survival for economic viability. It is imperative that investigation of the diagnosis, treatment, and prophylaxis of shrimp diseases under hatchery and pond conditions be accelerated. Of perhaps equal importance, are the identification and control of predators, especially those preying on small shrimp.

In the area of nutrition, we are still dependent in part on natural foods for good growth, with adequate growth almost invariably occurring in ponds with low population levels. Present food conversion rates are poor if natural foods are not available. However, we delude ourselves by omitting the role of natural food in our food conversion calculations, because the amounts of natural foods eaten cannot be measured. It is obvious that

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meaningful nutritional studies cannot be done in ponds, but must be undertaken in the laboratory where conditions can be rigidly controlled. Nutritional studies must be given high priority because high production is not possible until complete diets are available. Closely related to nutritional studies is the problem of identifying and controlling competitors. This is a critical problem in food conversion rates in seminatural ponds.

Development of a method to induce consistently sexual maturation of female shrimp should be given high, perhaps the highest, priority because of immediate need and the tremendous potential benefits to shrimp mariculture. Two major problems, the high cost of obtaining gravid females offshore and the dependence on the seasonal periodicity of gonadal maturation in wild stocks of females, would be eliminated immediately. Of more potential benefit is the exciting opportunity for selective breeding for such characteristics as increased fecundity, better survival, rapid growth, disease resistance, and suitability for hatchery and pond culture. Perhaps we can, with this tool, actually produce a breed of domesticated shrimp. If this concept seems naive or utopian, one need only to reflect on the development of our specialized breeds of domestic livestock from an oftentimes unrecognizable origin.